DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 1070
NASHVILLE, TENNESSEE 37202-1070

REPLY TO
ATTENTION OF

October 31, 2007

Project Planning Branch

To Whom It May Concern:

The U.S. Army Corps of Engineers, in accordance with the National Environmental Policy Act (NEPA) has prepared a draft Environmental Assessment (EA) to evaluate the impacts of two alternative grouting plans for repairs to the left rim of Center Hill Dam Smith County, Tennessee, near Lancaster. This is the second supplement to an EA published in July, 2005. The EA will provide the basis for a decision whether to proceed with preparation of an Environmental Impact Statement (EIS) or a Finding of No Significant Impact (FONSI). By way of this letter, we are soliciting public and agency review of the enclosed EA and unsigned FONSI.

The two alternative plans were not discussed in the previous EAs, but have come about as refinements to the construction plans have been made. The first alternative is to establish a new grout line along State Highways 96 and 141 along the left rim of the dam. This would decrease the amount of vertical drilling, and improve accuracy, consistency, and safety. It would, however, interfere with traffic for the duration of the project. The second alternative would also decrease the amount of vertical drilling and improve accuracy, consistency, and safety. It would eliminate most of the disruption to traffic, but would require cutting a 120 foot deep trench into the hillside along the alignment of the previous grout lines.

The public is invited to submit written comments no later than **Monday, December 3, 2007.** You may send your comments to the address above, ATTN: CELRN-PM-P (Wayne Easterling). Further information may be obtained by writing to the same address or by calling Mr. Easterling at (615) 736-7847. An electronic copy of the FEIS can be found at **http://www.lrn.usace.army.mil/CenterHill/**, and comments may be e-mailed to: **wayne.s.easterling@usace.army.mil**.

Sincerely,

SFI Patricia Coffey
Chief, Project Planning Branch

US Army Corps
of Engineers

Nashville District

ENVIRONMENTAL ASSESSMENT
Center Hill Seepage Rehabilitation Study, Supplemental EA 2

November 2007

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U. S. ARMY CORPS OF ENGINEERS
NASHVILLE DISTRICT

ENVIRONMENTAL ASSESSMENT

CENTER HILL SEEPAGE REHABILITATION STUDY, SUPPLEMENTAL EA 2

1. INTRODUCTION.

1.1. Study Authority.

The US Army Corps of Engineers (Corps) is studying alternatives to stop leakage of Center Hill Dam (CEN). This study is being conducted under the Center Hill Project's original authority. The Center Hill project was authorized by the Flood Control Act approved June 28, 1938 (Public No. 761, 75th Congress, 3d session).

In July, 2005, an Environmental Assessment (EA), evaluating grouting alternatives to control the seepage, was completed. That EA resulted in a Finding of No Significant Impact (FONSI) signed on July 17, 2005. The preferred alternative as listed in that EA and signed FONSI is to inject grout in a grout line on both sides of the dam (see Figure 1).

During the design of the grouting alternative, a more effective remediation treatment was identified which involved installing a concrete cut-off wall in addition to the grouting previously discussed. Therefore a Supplemental EA was prepared and a FONSI was signed on May 19, 2006.

As the final plans were being made for the grouting operation, two grouting alternatives not previously discussed were identified. This second supplemental EA is being prepared to address new alternatives pursuant to the National Environmental Policy Act (NEPA), Council for Environmental Quality (CEQ) regulations (40 CFR, 1500-1517), and the Corps implementing regulation, Policy and Procedures for Implementing NEPA, ER 200-2-2, 1988.. The two previous EAs are incorporated by reference and only pertinent information is summarized from these documents to provide an understanding of the current proposed alternatives. Previous documents may be obtained by contacting the Nashville District Project Planning Branch.

1.2. Background. In the early part of the 20th century, major floods occurred in the Ohio and Mississippi River Basins, resulting in disastrous losses of lives, property, and economic stability. Public demands for government agencies to take protective measures, led to the Corps' development of a comprehensive flood control plan in 1937.

The comprehensive plan proposed construction of 45 flood control reservoirs in the Ohio River basin. Six flood control reservoirs were recommended for the Cumberland River, four of which were eventually built. These four projects are Wolf Creek (Lake Cumberland), Dale Hollow, Center Hill, and J. Percy Priest Dams.

CEN was authorized by the Flood Control Act of 1938 (Public Law 761, 75th Congress, 3rd Session) and the Rivers and Harbors Act of 1946 (Public Law 525, 79th Congress, 2nd Session). Center Hill Lake's primary purposes are hydroelectric power production and flood control. Other public interest purposes such as the conservation of fish and wildlife resources are also authorized. The dam is located at mile 26.6 on the Caney Fork River near Smithville, Tennessee and was completed for flood control operation in 1948. At normal recreational pool, water surface covers approximately 18,000 acres. See Figure 1 for the project location.

1.3. Purpose and Need. CEN has a long history of foundation seepage problems through both the right abutment and left rim due to large solution features (caves) within the limestone formations. The risk for dam failure will exist until the seepage problems are addressed. This EA has be prepared to consider two alternate grouting operations that have been developed as plans are becoming more refined. These plans were not discussed in the previous two EAs, but have come about as refinements to the plans have been made. The first alternative is to establish a new grout line along State Highways 96 and 141 along the left rim of the dam. This would decrease the amount of vertical drilling, improve accuracy, consistency, and safety. It would, however, interfere with traffic for the duration of the project. The second alternative would also decrease the amount of vertical drilling, improve accuracy, consistency, and safety. It would eliminate most of the disruption to traffic, but would require cutting a 120 foot deep trench into the hillside along the alignment of the previous grout lines.

1.4. Coordination. This EA is being coordinated through all pertinent state and federal agencies. The EA will be circulated to non-government organizations (NGOs) and members of the public known to be interested in this action and they will have an opportunity to comment.

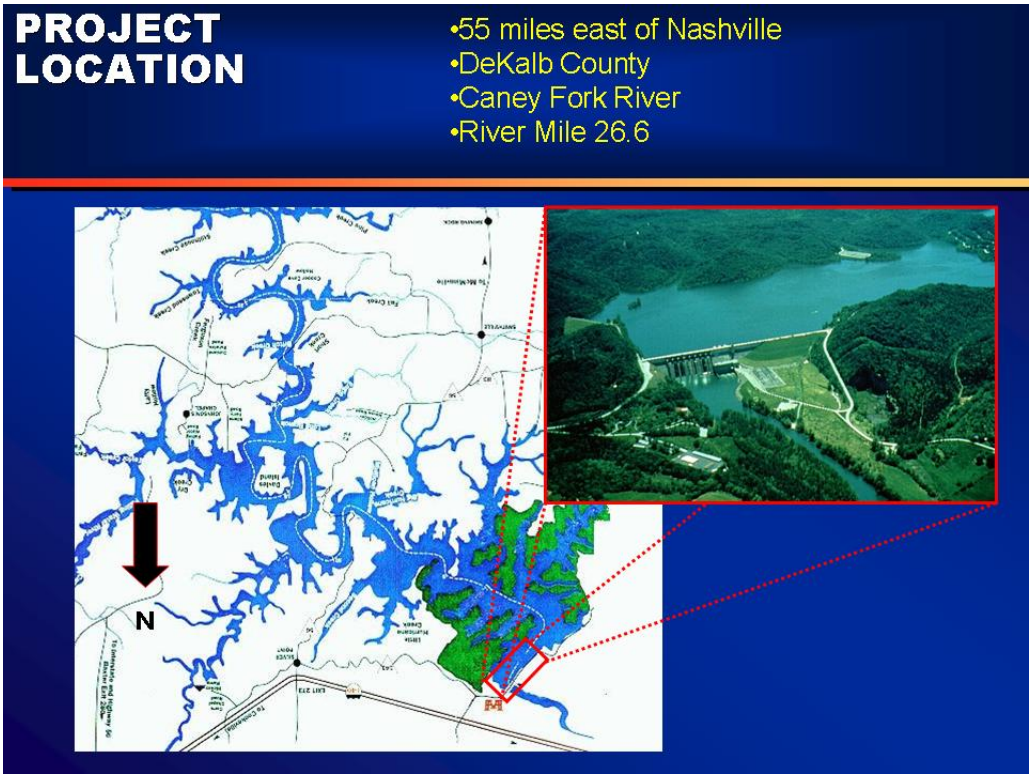

Figure 1

2. ALTERNATIVES CONSIDERED.

Three alternatives have been identified. These alternatives apply only to grouting alignments and related construction impacts on the left rim of the dam. The alternatives are 1) No Action, i.e., rehabilitating the dam in the manner already described in the two previous EAs, 2) construction of an alternate grout line following State Highways 141 and 96 (see Figure 2), 3) cut away the hillside along the previously described grout line (see Figure 3). These alternatives are described below.

2.1. Alternative 1, No Action. A No Action decision would follow the previously described repair procedures including re-grouting the previous grout lines and the installation of a concrete cut-off wall. These actions have already been studied approved, and permitted.

2.2. Alternative 2, Grout along Highways 141 and 96. Under this alternative the grout lines would be shifted to extend along the roads. This alternative would make it easier to place the drilling and grouting equipment and ensure increased accuracy and consistency in hole alignment. It would also increase the safety of the construction crews as they would not have to maneuver the heavy equipment up and down the steep hillside. However, at least one lane of the highways would have to be closed and traffic regulated

for up to two years. On infrequent occasions both lanes may be closed for short periods as equipment is moved. In addition, as this area has not been grouted in the past, additional passes with the drilling equipment would be required to ensure closure. This alternative would require minimal excavation. Fill quantities in the amount of 3,000 cubic yards(cy); 800 feet of guardrail removal and replacement; and 6800 square foot of face mechanically stabilized wall will be required to detour traffic on the groin.(cy). This alternative impacts an area greater than 750 feet(ft) by 50 feet (ft). See Figure 2.

2.3. Alternative 3, Cut the Hillside Along the Previous Grout Lines. This alternative proposes to excavate a trench to establish a work platform. The excavation would be up to 120 feet deep, much like a road cut, and would follow the path of the previous grout lines (see Figure 3). This would involve excavating more than 300,000 cubic yards of rock and overburden. The excavated material could be used in other construction features and the remainder would be disposed of on site in previously disturbed sites. This alternative offers several advantages. The operation would be safer for the public as fewer road closures would be involved and most of the work would avoid the roads altogether. Occasional temporary interruptions to traffic could be expected during blasting operations. Safety would also be improved for the construction employees as the excavated area would offer a relatively level work surface as opposed to trying to operate large heavy equipment on a steep hillside. Accuracy, consistency, and overall quality of the hole alignment would be improved. There may also be considerable cost savings. An estimated 4,000 holes would be required to establish a new grout line. In addition, this grout alignment would make use of the two previous groutings in the 1940s and 1990s. These savings would be passed on in future maintenance as it is anticipated that the area may require re-grouting every 15 to 20 years for the life of the dam. See Figure 3.

Figure 2 – Alternative 2, Grouting Along Roadways

Figure 3 – Alternative 3, Proposed Excavation Along Existing Grout Lines

2.4. Environmental Commitments, Permits, Approvals, and Compliance.

2.4.1. Section 404 of the Clean Water Act. All work would be above the ordinary high water elevations. A Section 404 review would not be required.

2.4.2. National Pollutant Discharge Elimination System (NPDES) Stormwater Permit. An NPDES Stormwater permit would be required for all of the alternatives except No Action. An NPDES permit would be obtained prior to construction.

2.4.3. Fish and Wildlife Coordination Act. A Fish and Wildlife Coordination Act Report has been requested.

2.4.4. Cultural Resources Requirements. The area has been extensively disturbed several times in the past. There would be no adverse effect on properties eligible for listing.

2.4.5. Endangered Species Act. None of the alternatives would impact any Federally listed Threatened or Endangered Species. All alternatives support a No Effect determination.

2.4.6. Resource Conservation and Recovery Act. All alternatives would be in compliance with the Resource Conservation and Recovery Act (RCRA).

2.4.7. Comprehensive Environmental Response, Compensation, and Liability Act. No Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites were identified within any of the project boundaries.

2.4.8. Farmland Policy Protection Act. No agricultural lands or Prime and Unique Farmlands are located in the project areas.

2.4.9. Executive Order 11988 - Floodplain Management. None of the alternatives will increase the risk of a "base flood".

2.4.10. Clean Air Act Conformity Rule. Currently the site is in an attainment area with regard to the National Ambient Air Quality Standard (NAAQS). None of the alternatives would have an effect on air quality.

2.4.11. Executive Order 12898 - Environmental Justice. Demographic information indicates no minority residents and low-income populations reside on or adjacent to the immediate proposed project areas. None of the alternatives, therefore, would have a disproportionate impact on minority or low-income populations.

2.5 Tables. Table 1 depicts the status of the environmental commitments and necessary permits and approvals. Table 2 shows the environmental and economic impacts associated with each alternative. Table 2 is derived from § 122 of P.L. 91-611 together with various project specific concerns. Table 3 evaluates the occurrence of possibly significant impacts as defined by the National Environmental Policy Act, commonly referred to as NEPA (40 C.F.R. §1500-1508). NEPA allows for a Finding of No Significant Impact (FONSI) if a selected alternative will not cause a significant impact, either adverse or beneficial, in any of the ten parameters set forth in the table. The definition of significance and the source of the ten parameters may be found at 40 C.F.R. 1508.27.

Environmental Commitment, Permit, or Approval	Status
Section 404 of the Clean Water Act	Not Applicable
NPDES Stormwater Permit	Will obtain prior to construction
Fish and Wildlife Coordination Act Report	Requested
Cultural Resources Coordination	Compliant
Endangered Species Act	Compliant
Resource Conservation and Recovery Act	Compliant
CERCLA	Not Applicable
Farmland Policy Protection Act	Not Applicable

Table 1 – Environmental Commitments, Permits, or Approvals

Env. and Economic Impacts	Alt 1 No Action	Alt 2 Grout Along Roadways	Alt 3 Excavate Existing Grout Lines
Air Quality	No Impact	No Impact	No Impact
Noise	No Impact	No Impact	No Impact
Water Quality	No Impact	No Impact	No Impact
Man-made Resources	No Impact	No Impact	No Impact
Natural Resources	No Impact	Minor Negative	Minor Negative
Aesthetics	No Impact	No Impact	Negative
Community Cohesion	No Impact	No Impact	No Impact
Public Facilities	No Impact	No Impact	No Impact
Public Services	No Impact	No Impact	No Impact
Employment	No Impact	No Impact	No Impact
Tax Values	No Impact	No Impact	No Impact
Property Values	No Impact	No Impact	No Impact
Displacement of People	No Impact	No Impact	No Impact
Displacement of Businesses	No Impact	No Impact	No Impact
Farms	No Impact	No Impact	No Impact
Comm. Growth	No Impact	No Impact	No Impact
Regional Growth	No Impact	No Impact	No Impact
Aquatic Resources	No Impact	No Impact	No Impact
Shoreline Erosion	No Impact	No Impact	No Impact
Economics	No Impact	No Impact	No Impact
Wetland Impacts	No Impact	No Impact	No Impact
T & E Species	No Impact	No Impact	No Impact
Cultural Resources	No Impact	No Impact	No Impact
Traffic	No Impact	Negative	Minor Negative
Environmental Justice	No Impact	No Impact	No Impact
Wildlife Resources	No Impact	No Impact	Minor Negative
HTRW	No Impact	No Impact	No Impact
Flood Control	No Impact	No Impact	No Impact
Navigation	No Impact	No Impact	No Impact
Recreation	No Impact	No Impact	No Impact
Safety	No Impact	Minor Negative	No Impact

Table 2 - Environmental and Economic Impacts

Env. and Economic Impacts	Alternative 1 No Action	Alternative 2 Close Boat Ramp	Alternative 3 Relocate Boat Ramp
1) Will the alternative cause any significant effects, either beneficial or adverse?	No.	No.	No.
2) Will the proposed alternative significantly affect public health or safety?	No.	No.	No.
3) Will the proposed alternative significantly affect any unique characteristics of the geographic area, such as proximity to historic or cultural resources, parklands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas?	No.	No.	No.
4) Is the alternative likely to be highly controversial?	No.	No.	No.
5) Are there any significant possible effects on the human environment that are highly uncertain or involve unique or unknown risks?	No.	No.	No.
6) Will the alternative establish a precedent for future actions with significant effects or does it represent a decision in principle about a future consideration?	No.	No.	No.
7) Is the alternative related to other actions with individually insignificant but cumulatively significant impacts?	No.	No.	No.
8) Will the alternative have a significant adverse effect on districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss of significant scientific, cultural, or historical resources?	No.	No.	No.
9) Will the alternative adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973?	No.	No.	No.
10) Does the alternative risk a violation of Federal, state, or local law, or requirements imposed for the protection of the environment?	No.	No.	No.

Table 3 – Determination of Significance of Alternatives

3. ENVIRONMENTAL SETTING (Baseline Conditions). The immediate proposed project area for the alternatives being covered encompasses the left rim of the dam.

3.1 Physiography. Center Hill Reservoir is located within two physiographic provinces of Central Tennessee designated as the Central Basin and the Highland Rim.

The Central Basin is a nearly elliptical area enclosed by the Highland Rim. The Central Basin was formed by erosion of the Nashville Dome, a low structural dome that makes up the structural and geographic center of the Basin. The dome represents the southern end of the Cincinnati Arch, an elongated area of upwarped rocks that extend into Tennessee. During the upwarping and doming, the rocks at the crest of the dome were stretched, resulting in the formation of joints. The weakened carbonate rocks were readily subject to solution and erosion, resulting in a topographic basin that now occupies the top of the structural dome. The Basin is characterized by calcium carbonate sedimentary rocks of Ordovician age. These sedimentary rocks comprising the Central Basin include limestone, shale, dolomite, siltstone, sandstone, and claystone.

The Highland Rim is a ring-shaped hilly upland completely encircling the Central Basin. It stretches from the western margin of the Cumberland Plateau southward and westward as far as Kentucky Lake. Terrain is a level to rolling plateau with soil cover varying from 20 to 100 feet thick. Bedrock is flat-lying limestone of Mississippian origin. Numerous rock outcrops and sinkholes are present in this region. Sinkholes are formed by the collapse of underground cavities dissolved out of limestone by the flow or percolation of subsurface water streams and seepages. In areas where such sinks are common, the terrain is referred to as karst topography.

3.2. Recreation. Recreation was not originally an authorized project purpose. The Federal Water Project Recreation Act of 1965 established development of the recreational potential at federal water resource projects as a full project purpose. Recreation has become a major factor in the regional economy. Because of the temperate climate control and relatively long recreation season, visitors have many opportunities to fish, hunt, camp, picnic, boat, canoe, hike, and enjoy the outdoors. Center Hill Lake supports eight recreation areas, 15 minor access areas, four campgrounds, nine marinas, two group camps, three state parks, and seven picnic areas with 214 picnic sites. An estimated 2.9 million people visit the lake annually, generating approximately 82.7 million dollars in recreational benefits.

The most noteworthy attributes of the tailwaters are their aesthetic qualities and recreational potential. Recreational fishing and boating, particularly trout fishing and canoeing, are by far the major activities accounting for visitation.

3.3 Historic Properties. Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effect of their undertakings on

historic properties, properties that are considered eligible for or listed on the National Register of Historic Properties. Regulations at 36 CFR 800 define a process for taking such effects into account. Center Hill Dam, and the facilities associated with this structure are considered potentially eligible for listing on the National Register of Historic Places. No additional historic properties have been identified in the project's "area of potential effects."

3.4 Socio-Economic Resources. The population of DeKalb County in 2000 was 17,243. DeKalb County maintains a relatively diversified employment base with manufacturing, education, health care and retail trade as the primary industries in terms of employment. Other major industries include accommodation and food services, administration and support services, construction, wholesale trade, and transportation. As of 2000, the total civilian labor force in the county was 8,424; unemployment rate was 3.2% (3.5% average for Tennessee). As of 1999, the per capita income level in DeKalb County was $17,217 ($19,393 average for Tennessee). The percent of persons living below the poverty level in DeKalb County in 1999 was 17% (13.5% average for Tennessee). In 2000, less than 5% of the county population is considered minority.

It appears that there are many acres in the watershed used for agriculture such as cattle grazing and hay production. According to the 2000 census data, 2.1% of the 16 years of age and over population within DeKalb County has an occupation classified as Farming, fishing, and forestry.

CEN is a significant economic factor in the region. In addition to the recreation, hydropower, and flood damage reduction benefits discussed above, the dam provides many other advantages including municipal water supply, increased property values, increased tax revenues, and employment opportunities.

The dam has prevented significant flood related damages over the years. The level of safety provided by the dams has encouraged the development of communities and businesses along the rivers. In addition, the relatively inexpensive and dependable electricity provided by the power plant has contributed to the region's economic well-being. CEN annually generates approximately 381,000 MWH worth about $5.3 million. Although recreation was not originally an important consideration and was not an authorized project purpose until passage of the Federal Water Project Recreation Act of 1965, it has become a major economic factor in the region.

Center Hill Reservoir currently supports 3 separate water intakes. All together, they can withdraw up to 21,592,000 million gallons per day (MGD). These intakes supply water to the cities of Cookeville and Smithville Cities, and Riverwatch Golf, Inc.

3.5 Aquatics. Center Hill Reservoir contains mainly a warm-water fishery. Major game species include: black bass (*Micropterus spp.*), sunfish (Family *Centrarchidae*), walleye (*Stizostedion vitreum*), and catfishes (*Ictalurus spp.*). Center Hill is a deep,

clear lake that undergoes strong thermal stratification from mid-spring until mid-fall. During stratification depletion of dissolved oxygen (DO) occurs below the epilimnion. DO levels are too low to sustain life below the epilimnion at certain times of the year. Tennessee Wildlife Resources Agency (TWRA) has primary responsibility for fisheries management at Center Hill Reservoir.

The CEN tailwater extends 26 miles from the Dam at Caney Fork River Mile 26.6 to the mouth of the Caney Fork River at its confluence with the Cumberland River. The Caney Fork River is characterized by a series of oxbow bends with the inside semicircular tips relatively flat and the outside banks quite steep and often vertical. The width of the channel averages 250 feet. Pool and shoal areas are well defined during non-generation and low-flow periods but are hidden during higher flow periods. The streambed is comprised of bedrock and gravel beds. River banks range up to 30 feet in height, are relatively stable, and support a wide variety of plant growth.

The cold water released through the turbines at CEN and the non-release leakage flow around and through the dam creates conditions favorable to the maintenance of a trout fishery in the Caney Fork River. Many of the native aquatic species in the tailwater have been extirpated due to the cold water temperature. To mitigate for the loss in recreation, TWRA and the U.S. Fish and Wildlife Service have annually provided trout in this reach of the Caney Fork River. The river has an artificial fish community mostly comprised of trout, shad, and carp. Walleye, white bass, yellow bass, striped bass, redhorse and buffalo are also observed seasonally (Fiss and Young, 2003).

The trout population below CEN is maintained by stocking. The following excerpt is reported by TWRA in the Management Plan for the Center Hill Tailwater Trout Fishery 2004-2009:

> *In recent years the number of 9-inch rainbow trout stocked averaged 115,000 annually (Figure 3). These "catchable" rainbows are stocked at rate of 3,000 to 15,000 per month and sustain a put-and-take fishery. "Put-and-take" describes a fishery where fish are stocked at a large enough size to be immediately harvested by anglers. Fingerling rainbow trout have also been stocked in recent years (Figure 3). The stocking rate of brown trout has varied from 17,000 to 70,000 (Figure 4). Traditionally brown trout were stocked at 6-8 inches in early summer. In 1999, TWRA shifted to a fall stocking of 4-inch brown trout as suggest by Devlin and Bettoli (1999). Brown trout support a "put-and-grow" fishery as these fish need time to grow into desirable sizes.*

3.6 Terrestrial Resources and Land Use. The Center Hill Reservoir can be characterized as having a mixed mesophytic deciduous forest vegetation type. Forest community classifications for the Center Hill area include upland hardwoods, red cedar stands, cove hardwoods, and wetlands.

Surrounding areas are labeled as an oak-hickory complex interspersed with Eastern red cedar. Trees common to the area include oaks (*Quercus spp.*), hickories (*Carya spp.*), yellow poplar (*Liriodendron tulipifera*), black walnut (*Juglans nigra*), white ash (*Fraxinus Americana*), hackberry (*Celtis occidentalis*), elms (*Ulmus spp.*), American beech (*Fagus grandifolia*), and blackgum (*Nyssa sylvatica*). Common understory species associated with this type include flowering dogwood (*Cornus florida*), black cherry (*Prunus serotina*), redbud (*Cercis Canadensis*), and persimmon (*Diospyros virginiana*).

Lands surrounding Center Hill Reservoir are managed to promote beneficial habitat conditions for both game and non-game species of wildlife. Present conditions are most favorable to species such as white-tailed deer (*Odocoileus virginianus*), wild turkey (*Meleagris gallopavo*), squirrel (*Sciurus spp.*) and other animals associated with mature forest habitat.

Seven state-listed species are known to occur within a 1-mile radius of the project area, Price's potato bean (*Apios priceana*), Cerulean warbler (*Dendroica cerulea*), Svenson's wild-rye (*Elymus svensonii*), Harper's umbrella-plant (*Eriogonium longifolium var. harperi*), Western wallflower (*Erysimum capitatum*), fen orchis (*Liparis loeselii*), and nodding rattlesnake-root (*Prenanthes crepidinea*). Three of the above species have been identified close to the project area, Harper's umbrella plant, fen orchis, and Svenson's wild-rye.

3.7 Threatened and Endangered Species. According to a US Fish and Wildlife Service (USFWS) letter dating May 18, 2004, USFWS stated that the Price's potato bean (*Apios priceana*) and the gray bat (*Myotis grisescens*) may be located within the area of potential effect.

The solution features (caves) within the project area are directly connected with the reservoir as determined by temperature profiles, jointing, dye traces, and flow response to lake elevation changes. A majority of the time these caves have water flowing through the open spaces. It would be highly unlikely to serve as roosting habitat for the gray bat. Many of the solution features were formed by the increased water pressure resulting from the reservoirs construction.

According to a phone conversation on February 7, 2005 with the USFWS, Price's Potato Bean is most likely not located within the area of potential effect.

3.8 Wetlands. No wetlands are identified within the proposed project boundaries.

3.9 Hazardous, Toxic and Radioactive Waste (HTRW). No known HTRW sites are within the proposed project area.

3.10. Traffic. State Highways 96 and 141 traverse the top of the dam and split,

Highway 96 proceeding up the lake toward Smithville and Highway 141 proceeding downstream toward Lancaster. A complete closure of these roads would create a severe inconvenience to local residents at best and would add a number of mile to their trips depending on the routs chosen.

3.11. Safety. Safety is an intrinsic consideration in the planning and operation of the reservoir. Safety concerns include the safety of the working conditions for the construction crews and attempting to operate a construction site in close proximity to public highways and traffic.

3.12. Air Quality. Currently the site is in an attainment area with regard to the National Ambient Air Quality Standard (NAAQS).

3.13. Noise. Due to a lack of human receptors, noise is not currently a factor at the project site. The main source of noise is the highway.

4. ENVIRONMENTAL IMPACTS.

4.1 Physiography. Neither the No Action plan nor grouting along the roadways would significantly affect the physiography of the area. Alternative 3 would excavate a trench in the hillside up to 120 feet deep and would resemble a road cut as may be seen throughout much of Tennessee. Storm water drainage would likely see some minor changes, but no blue-line streams would be affected. The excavation would be largely unnoticeable from the lake; however, it would change the existing view from the dam, particularly for those west-bound on Highway 96. This change of view would be mitigated after construction by placing an earthen plug at the end of the cut and using vegetation to obstruct many of the changes.

4.2. Recreation. This area has been used for public hunting in the past. The construction area would be closed to hunting regardless of the alternative selected. None of the alternatives would impact recreation beyond those already described in previous documents.

4.3. Historic Properties. The area has been extensively disturbed in the past both during construction (see Figure 4) and during subsequent grouting operations. The No Action and Alternative 2, grouting along the roadways, would not affect any historic properties. Alternative 3, Excavation, would not directly affect any historic properties, but would affect the view shed of Center Hill Dam. This impact could be mitigated by photographing and otherwise documenting the existing conditions and by placing an earthen plug at the end of the excavation and revegetating it to soften the visual impact. Figure 5 shows the dam and left rim as they now exist. Figure 6 illustrates how the view may appear if Alternative 3 is selected.

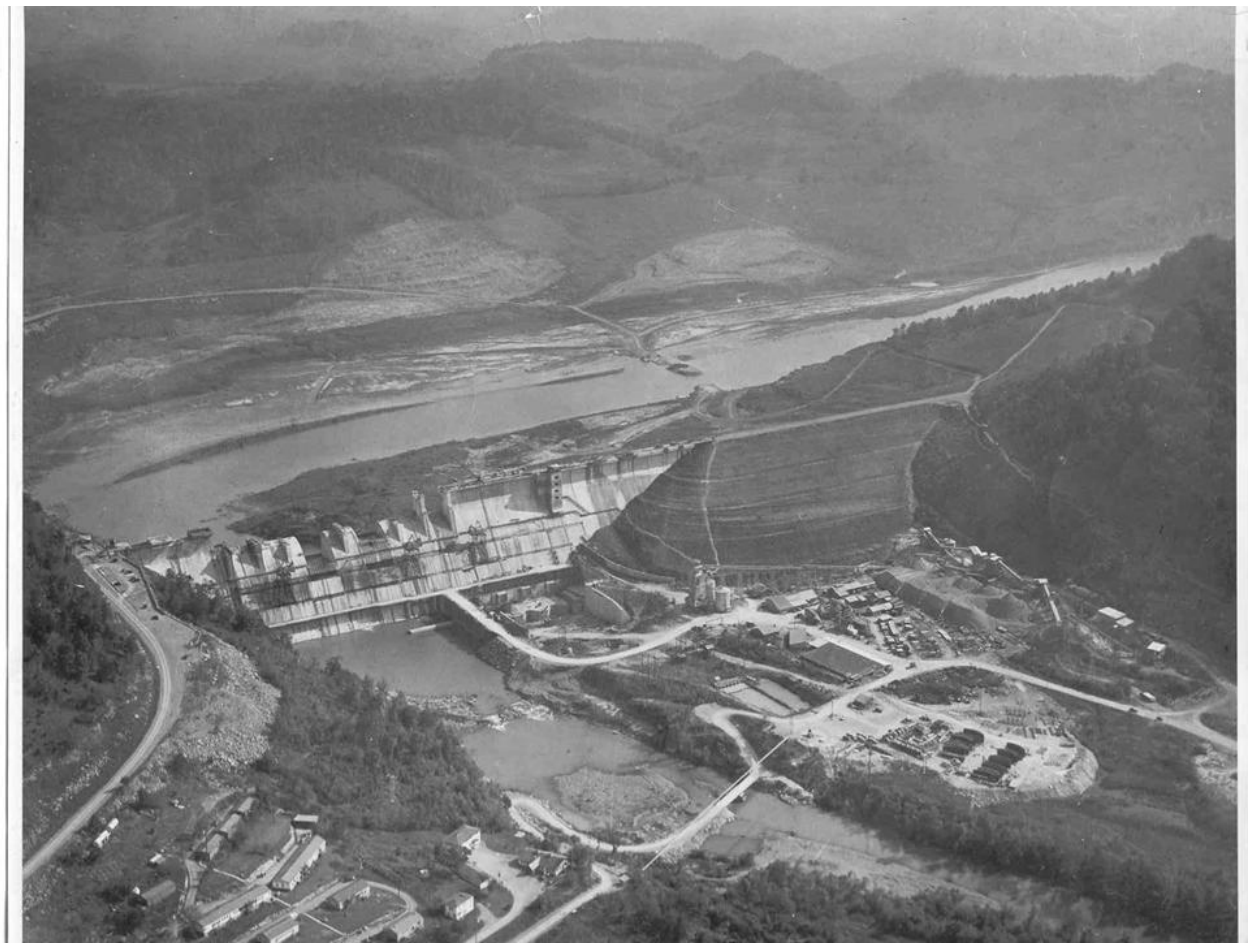

Figure 4 – Center Hill Dam and the Left Rim during Construction

Figure 5 – Current view of Center Hill Dam and the Left Rim Looking West

Figure 6 – Illustration of How the View May be Affected if Alternative 3 is Selected

4.4 Socio-Economic Resources. None of the alternatives would affect the socio-economics of the area beyond those already described in previous documents.

4.5. Aquatics. None of the alternatives would occur in either the lake or in a blue-line stream. Best Management Practices (BMPs) would ensure that no negative impacts from storm water run-off would impact the aquatic resources. None of the alternatives, therefore, would affect any aquatic resources beyond those previously discussed in other documents.

4.6. Terrestrial Resources. The No Action impacts have been previously described in other documents. In summary, there would be some loss of vegetation as platforms for the grouting were cleared. Staging areas for both equipment and disposal would be located in previously disturbed and cleared areas. Alternative 2, grouting along the roadways, would avoid most of those impacts as the majority of the work would take place on existing cleared and paved roadways. Alternative 3 would realize a permanent loss of some resources within the excavation area as it would be cut down to bare

bedrock. The area would be relatively small as compared with the overall Center Hill project, and would be roughly 300 feet wide and 1,500 feet long at its greatest dimensions. Once completed this area would serve as a platform for all future grouting operations which are anticipated to be required every 15 to 20 years, so this could be considered as a long term project feature.

4.7. Threatened and Endangered Species. Species identified previously as possibly residing near the project area include Price's potato bean and the gray bat. Through previous discussions with state and Federal agencies it was been determined that the proposed work would not affect either of these species. As all of the alternatives proposed in this document are within the same area of effect as the previous studies, a finding of No Effect can be made for both species for all alternatives.

4**.8. Wetlands.** Wetlands would not be affected by implementation of the proposed action as there were no wetland sites identified in the area of potential effect.

4.9. Hazardous, Toxic and Radioactive Waste. There are no known HTRW sites in the area of potential effect. No Impacts would occur.

4.10. Traffic. During some phases of construction there would be some minor traffic interruptions for both the No Action alternative and Alternative 3, Excavation, as construction and earth moving equipment crossed the road and when blasting. These interruptions would be short and would have little impact on the overall traffic flow. Alternative 2, grouting along the roadways, would require that at least one lane be closed for the entire length of construction, i.e., an estimated two years. This would slow and back up traffic and be an inconvenience, particularly for those who live locally. Many would likely use alternate, albeit longer and less convenient, routes.

4.11. Safety. Alternative 3, excavation, would be safer than the No Action alternative as it would eliminate maneuvering large equipment on the steep hillsides. As the left rim is anticipated to require regrouting every 15 to 20 years, excavation would provide a permanent gain in safety. The primary safety hazard would derive from the traffic concerns noted above. Any action which lessens the traffic concerns will also reduce the potential for accidents. To that end, the excavation alternative which would have less traffic concerns than Alternative 2, grouting along the roadways, would likely be safer for the public.

4.12. Air Quality. All of the alternatives would have minor impacts on air quality from vehicle and equipment exhaust and from fugitive windborne dust. These effects would be minimized by implementing adequate construction BMPs and the effects would be negligible.

4.13. Noise. All of the action alternatives would create some equipment noise. However, noise would be localized and would last only until the construction was

completed.

4.14. Cumulative Effects. Cumulative impacts are defined as “the impact on the environment which results from the incremental impact of the (proposed) action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7)”. Council for Environmental Quality (CEQ) guidance identifies an 11-step process for evaluating cumulative effects.

The assessment can be defined by “what resource goals are the proposed action going to affect”. Effects can result from either direct-project related, indirect-project related, and independent indirect causes. This is an incremental change to a larger project already described in two previous studies. Based on the public and agency scoping and review performed for the previous NEPA documents conducted for this project and the limited scope of the changes from previous studies, no biological or ecological resources have been identified for which cumulative effects must be assessed.

5. CONCLUSIONS. Three alternatives were discussed. In this case, No Action, was to follow the previously studied and approved plans. Alternative 2 proposed realigning the grout lines to make use of the existing roads. This would be safer for the work crews as it would eliminate operating large equipment on steep hillsides, however, it would have negative impacts on traffic and traffic safety for the public. Alternative 3, excavating the hillside to construct a permanent platform from which current and future operations could safely be conducted would have some negative impacts on the aesthetics and view shed of the dam. Each alternative has merits and drawbacks. None of the alternatives would have significant impacts. It is therefore recommended that the final determination be made based on engineering and economic related factors..